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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/503,041	02/11/2000	Rajiv Laroia	14-7-3-3	6041

7590 10/31/2003

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EXAMINER

WAXMAN, ANDREW

ART UNIT	PAPER NUMBER
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2667

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DATE MAILED: 10/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/503,041

Applicant(s)

LAROA ET AL.

Examiner

Andrew M Waxman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 and 25-39 is/are rejected.
- 7) ☒ Claim(s) 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 8, 9, 11, 12, 13, 18 and 35-47, are rejected under 35 U.S.C. 102(e) as being anticipated by Suzuki (US Patent No. 5970047).

Regarding claims 1 and 35-47, Suzuki discloses, a multiple access cellular/wireless environment with a plurality of mobile stations (terminals) communicating with a base station, where the signals are shown separately as correlating to their respective mobile terminal time slots (U0-U5) and timing signals (Figures 3A-3G), with transmission and reception time slots indicating the communication to and from the base station to the mobile users using orthogonal signals (Col 4, lines 39-56).

Regarding claim 8, Suzuki discloses, a guard time used for separation of signals (Col 4, lines 28-30).

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Regarding claim 9, Suzuki discloses, the base station receiving a signal sampled at a rate of 8 khz.

Regarding claim 11, it is inherent for a base station timing and access sample window to undergo a process of synchronization with a data sample window of a base station, it is well known in the art that in a mobile system that contains a base station, that a sampling window samples data and synchronization is imminent throughout the data sending and receiving process, therefore it is inherent for a bases station that sends and receives data to synchronize the data based upon what data is preset in the systems aforementioned data window.

Regarding claim 12, Suzuki discloses, an IFFT and FFT (Figures 14 and 11) used for the twenty-two multi-tone signals.

Regarding claim 13, Suzuki discloses, control signals used for timing prepared in advance in the memory (Col 11, lines 25-33).

Regarding claim 18, Suzuki discloses: spreading the signal in a spread spectrum format (Col 1, lines 65-67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2-7, 10, 14, 15, 21-23, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US Patent No. 5,970,047) in view of Schmidl et al. (US Patent No. 6,546,055).

Regarding claims 2-7, 10, 14, 15, 21-23, 25 and 26, Suzuki discloses, a mobile communications system with mobile terminals and a base station communicating with orthogonal signaling used for timing signals to be received by the base station by a sample window, for the purpose of simplifying the arduous task of separating multiple transmission signals for reducing interference and providing efficient communication transfers in a mobile environment (Col 2, lines 38-42).

Suzuki does not disclose OFDM implementation, baseband signals as multiples of a window size of a single period, non-overlapping, cyclic prefix used for eliminating multipath dispersion, capturing a period of a sinusoidal signal in the sample window of the base station, using non-overlapping signals, autocorrelation, a ML (Maximum Likelihood) function used for estimating a timing correction, and multipath components prearranged into memory of the base station.

Schmidl discloses, an OFDM system that uses sampling windows for synchronization information derivation (Col 4 ,lines 50-55), with a cyclic prefix used to separate signals and eliminate multipath distortion (Col 5, lines 5-12) an analog sinusoidal signal (Col 6, line 65), a

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correlation process for the cyclic prefix to indicate a phase shift between data symbols in a multipath environment (Col 7, lines 10-16), a ML function used for estimating the timing (Col 12, lines 14-17) all for the purpose of achieving better timing and synchronization under one of the embodiments of the invention.

Therefore at the time the invention was made it would have been obvious to one of ordinary skill in the art to have combined the invention as disclosed by Schmidl, and the invention as disclosed by Suzuki.

One of ordinary skill in the art would have been motivated to do this in order to perform the combined process of managing multiple signals while maximizing the speed and processing of the signals and minimizing the interference and probable errors.

Regarding claim 26, Suzuki discloses, an IFFT and FFT (Figures 14 and 11) used for the twenty-two multitone signals.

Claim Rejections - 35 USC § 103

3. Claims 16 and 27-34, are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US Patent No. 5,970,047) in view of Schmutz (US Patent No. 5,930,308).

Regarding claims 16 and 27-34, Suzuki discloses, all of the above embodiments.

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Suzuki does not disclose a threshold that changes for signal power and signal detection.

Schmutz discloses, a cellular phone system with a base station 10 (See Figure) and a dynamic threshold setting arrangement for the variations in signal power used for detection of a signal.

Therefore, at the time the invention was made it would have been obvious to one of ordinary skill in the art to include a threshold that changes for signal power and signal detection, as disclosed by Schmidl, into the invention as disclosed by Suzuki.

One of ordinary skill in the art would have been motivated to do this to provide a more accurate signal compilation by the receiver, as sought by the disclosed goals of the invention.

Claim Rejections - 35 USC § 103

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US Patent No. 5,970,047) in view of Schmutz (US Patent No. 5,930,308) and further in view of Ansbro et al. (US Patent No. 6,330,294).

Regarding claim 17, Suzuki in view Schmutz discloses all of the limitations as recited above with respect to claim 16.

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Suzuki in view of Schmutz does not disclose a threshold that changes for signal power and signal detection.

Ansbro discloses, a Chebychev filter as a type of filter used in channel estimation.

Therefore, at the time the invention was made it would have been obvious to one of ordinary skill in the art to include the use of a Chebychev filter with the channel estimation process used in the receiver of the mobile station.

One of ordinary skill in the art would have been motivated to do this in order to help facilitate the enhancement of the communication link quality, thereby providing for a more reliable communication system.

Claim Rejections - 35 USC § 103

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Almouti et al (US Patent No. 6,560,209) hereinafter referred to as Almouti.

Regarding claim 19, Suzuki discloses all of the limitations as recited above with respect to claim 18.

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Suzuki does not expressly disclose separating the groups by an amount greater than a channel coherence bandwidth.

Almouti discloses the frequency separation being greater than a channel coherence bandwidth. See col. 27 lines 43 – 51.

Therefore, at the time the invention was made it would have been obvious to one of ordinary skill in the art to separate the groups by an amount greater than a channel coherence bandwidth, as disclosed by Almouti, in the invention as disclosed by Suzuki.

One of ordinary skill in the art would have been motivated to do this in order to minimize the likelihood that carriers are simultaneously faded, and to help in minimizing the probability of inter-symbol interference.

Claim Rejections - 35 USC § 103

5. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki.

Regarding claim 20, Suzuki discloses all of the limitations as recited above with respect to claim 1.

Suzuki does not expressly disclose the coefficients of the signals being selected such that the peak-to-average ratio of the signal is minimized.

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Although Suzuki does not expressly disclose the coefficients of the signals being selected such that the peak-to-average ratio of the signal is minimized, this would clearly provide for a way to maximize the average transmission power, and facilitate the minimal loss of intelligibility at the receiver. Therefore, at the time the invention was made it would have been obvious to one of ordinary skill in the art to select the coefficients of the signals such that the peak-to-average ratio of the signal is minimized, into the invention as disclosed by Suzuki.

One of ordinary skill in the art would have been motivated to do this in order to provide for a more reliable transmission system.

Allowable Subject Matter

Claim 24 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Although the maximum likelihood function employs an eigenvector analysis in some descriptions of the function found online in scholarly papers and related sources, the average auto-correlation feature represented by eigenvectors, where the average is taken over the

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randomness of the multi-path channel and signal noise, is unique to the art and is thus allowable under a rejected mothering claim.

Response to Arguments

Applicant's arguments filed 15 August 2003 have been fully considered but they are not persuasive.

Regarding claims 1, 8, 9, 11 – 13, 18, and 35 – 39, Applicant contends that the prior art of record does not teach or fairly suggest “the at least one signal is from a signal set which includes a plurality of orthogonal signals, such that different timing and access signals from the mobile station and at least one other mobile station of the system are received at the base station orthogonal to one another.”

However, the Examiner contends that the prior art of record does indeed teach the above limitation. Suzuki discloses an orthogonal base system, including transmissions from mobile users to base station using orthogonal signals. In order for an orthogonal signal to be properly synchronized at the receiver, and synchronization mainly comprises three parts: frame detection, carrier frequency offset estimation, and sampling error correction. Frame Detection within an orthogonal transmission system requires the use of pilots included in the signal transmitted to the receiver (base station). Therefore, it is inherent to Suzuki that in every signal transmitted, from mobile station to base station, there will be uplink timing synchronization signals (pilots).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew M Waxman whose telephone number is (703) 305-8086. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (703) 305-4378. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

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Andrew M. Waxman


CHI PHAM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600 09/28/03